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## **Site Contamination Problems in the Republic of Latvia: Ongoing Clean-up Activities and Future Pollution Prevention Plans**

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Today the problem of site pollution in the Republic of Latvia is becoming more and more important not only as an environmental problem, but also as one, which hinders the growth of economics because it creates difficulties for investments.

In the Environmental Policy Plan of Latvia, officially approved in 1995, the site pollution problem was not identified as the first priority. At that period such issues as drinking water supply & wastewater treatment, waste management and air pollution problems were considered as more urgent.

Presently situation has changed and site contamination problem is one of those which needs be solved within the near future.

Activities already carried out have indicated a lot of difficulties in this area. One of the main among them is related with the fact that Latvia (similar as other Baltic Countries) has enormous amount of old contaminated sites left as a heritage by former Soviet System. This makes situation very specific as it is almost impossible to use the principle "Polluter pays", which step by step is becoming the main approach in a solution of current environmental problems in Latvia. In this case the polluter is well known but it will never pay, especially if it is former Soviet Army. It means that there is need to find out specific ways how to solve this problem. This creates huge economical and juridical difficulties. From one side the State does not have resources for clean-up activities. From other side most of landowners, which have received their properties in the result of denationalization and privatization processes, also do not have enough resources. Lack of rules how to deal with pollution on these lands create problems both as for local landowners as well as for international investors who is interested to run their business in some of former military sites such as naval bases, airfields, different reparation plants etc. This is also a huge problem for the Latvian Armed Forces as our military units mainly are stationed in former Russian military bases.

At the present moment policy makers in Latvia still have not exactly defined the main approaches for solution of polluted military sites problem, but it is more likely that site remediation predominantly will make a part of normal commercial redevelopment of land with funding considered at the level of individual site, than being a part of a specific overall national environmental improvement programme. The process could start with the sites having a very high level of risk to human health and environment.

Therefore the most urgent task is to set up a legal base for contaminated sites management and pollution prevention. This process is under active development now. The special law - Law on Pollution Control is in a stage of drafting and the first draft of the main chapters just is reviewed.

The main functions of the chapter "Contaminated Areas" are to:

- provide for inventory and registration of contaminated and potentially contaminated areas in Latvia;
- determine general preconditions for information, investigation and remediation measures in connection with contaminated and potentially contaminated areas;
- determine the financial liability for investigation and remediation measures;
- provide the necessary legal instruments for State institutions to conduct and administer investigations and remediations.

According to the accepted plan this law should be approved by Parliament till middle of the next year.

Some progress is achieved also regarding such practical activities as assessment, investigations and clean up of contaminated sites.

First of all it is necessary to mention that today the ecological assessment of former military sites in Latvia are carried out according to one set of methods, worked out within the scope of work of Latvian - Norwegian cooperation project. The experts of the Latvian and Norwegian Geological Surveys assessed and investigated more than 600 former Soviet military sites, 255 of which were incorporated in special computerized database. The database was established using MS ACCESS software. The database contains all information collected during the studies of former military sites.

The Latvian and Norwegian specialists developed criteria, based on which all sites have been subdivided into 4 groups:

I group – sites, in which it is evident that site is polluted with hazardous substances and poisons spread into the environment or sites contaminated with explosives which all together could cause essential threat to human life and to the environment, detailed investigations and clean-up activities are urgent;

II group – sites regarding which there is only some information about pollution of the site with hazardous substances which could cause threat to human life and to the environment, further site investigations are required;

III group – sites, where pollution of site is insignificant and possibility of migration of hazardous substances also is unessential, site investigations are required only in case of change of land use;

IV group – sites where there is no evidence of pollution and hazardous materials, further site investigations are not required.

According to the mentioned criteria 255 main former military sites were assessed and result was follows:

- in I group – 14 sites;
- in II group – 17 sites;
- in III group – 62 sites;
- in IV group – 171 sites.

The most dangerous for human health and the environment is I group which consists of 7 former rocket bases, 2 big fuel stations, 1 very large bombing range, 1 ammunition storage site, 1 airfield, 1 tank reparation plant and 1 submarine base in former Liepaja Naval Base.

Petroleum pollution of the soil was found to be the most widespread of all the problems resulting from the Soviet Army's activities. The most polluted petroleum areas were found where fuel and lubricants were pumped, stored, and transported and where transport and combat materials were washed, especially after accidental spills. Almost in all detailed investigated fuel storage sites free phase oil has been found.

Another very serious problem is unexploded ordnance in former bombing ranges and ammunition storage sites (especially if explosives are deep in soil).

Detailed pollution investigations are carried out only in some of military sites, and mainly it has been done with assistance of our donor countries (Denmark, Norway, Germany, Canada as well as USA and Sweden). Here we can mention:

- the investigations of Lievarde and Rumbula airfields (with assistance of Germany and Denmark),
- the investigation and remediation pilot project of rocket base in Liepaja district (in cooperation with Canada),
- the investigations of fuel base and site of former tank reparation plant in Riga (in cooperation with Norway),
- ongoing activities in Adazi training field (cooperation with USA and Sweden),
- Liepaja Harbour Environmental Study (Phare Programme with participation of Danish specialists),
- planned activities in the area of former Liepaja Naval Base - Liepaja Karosta district (in cooperation with Canada).

Up to now clean-up activities are carried out only in some of very harmful sites. Mainly those are pilot projects with purpose to find the best clean-up technologies and to prevent the spreading of hazardous substances to drinking water reservoirs and ambient surface water bodies. Such activities are carried out in the former Rumbul Airbase in Riga and in the Barta Missile Base in Liepaja district.

**The former Rumbula Base** is located in the southern part of Riga between the Riga–Daugavpils Highway and the Daugava River approximately 15 km from Riga Centrum. The airbase covers an area of approximately 3.0 km<sup>2</sup>. Rumbula Airbase operated as a military base from 1954 until 1978.

The primary objective of the Rumbula Airbase project was the clean-up of the pollution remained after Soviet military activities and the preventing from oil spreading into drinking water reservoirs and the Daugava River. Depth to ground water at the base averages 2.3 m below ground surface, and ground water flow direction beneath the site is south to south-easterly, toward to the Daugava River.

There are identified four areas where ground waters are polluted with dissolved oil product contaminants (200 ha or approximately ½ of Rumbula Airbase area) and six areas with free phase aviation fuel (in total approximately 10 ha). Thickness of free phase product in different places was found of 0.2 to 1.0 m. Soil pollution mainly tied to areas of free phase products in zones of seasonal fluctuation of the groundwater level.

The Rumbula Airbase project still is in progress. In 1998 there were carried out the technical investigations with purpose to find the most efficient and cost-effective technologies for recovery of free phase aviation fuel (skimming, pumping and vacuum enhance). Latvian company Baltec Associates, SIA and Danish company Hedeselskabet participate in these investigations in the area of former Rumbula Airbase. Latvian Government, Danish EPA and Riga Municipality fund the activities mentioned above.

**The former Barta Military Base** is situated in western Latvia. This former missile base was abandoned in the fall of 1994.

Riga Technical University, Canada-Emergencies Engineering Division and Gartner Lee International Inc. have conducted an environmental assessment at this base. Initial assessment activities identified a site where reportedly 11 tons of "SAMIN" missile fuel has been spilled. Xylidine (aminodimethylbenzene) is the pollutant of concern in the "SAMIN" spill. The assessment activities identified a 0.5 m layer of free-product floating on the shallow water table over an area of at least 800 m<sup>2</sup>.

In a field remediation demonstration conducted in 1996, ex-situ land farming was evaluated for treating xylidine-impacted soil. The xylidines analysis from the control plot indicates that approximately 60% of the initial concentration of xylidines was lost by volatilisation, leaching or intrinsic biological processes. These results demonstrated that land farming, as one of the most cost-effective methods for treatment of contaminated soil, could be the most feasible remedial option for treating contaminated soil at the Barta Military Base and in other similar sites.

It is very important to take care about the former military sites, but at the same time it is also significant to prevent contamination of those sites occupied by Latvian Armed Forces. It means, on the one hand there is need to organise military training and manage the military facilities in an environmentally sound manner, on the other hand it is necessary to deal also with historical pollution left by foreign armies as Latvian military units mainly are stationed in former Russian military bases.

Latvian Ministry of Defence and Ministry of Environmental Protection and Regional Development have started to incorporate environmentally sound approaches in practice of military training. Project – so named the Environmental Security Project initiated by USA Sweden is a very important support within these undertakings. The main purpose of this project is:

- to strengthen the co-operation and co-ordination between military and civilian organisations;
- to train the military personnel in the environmental management and to prevent further degradation.

In framework of this project the Latvian, US and Swedish military and environment officials agreed about co-operation in order to develop the Environmental Base Management Plan for Adazi Military Training Base. The Management plan will serve as pilot project and will:

- establish objectives and develop procedures to achieve sound environmental management;
- determine the level of environmental training necessary for personnel at various stages of command;
- set priorities and monitor clean-up activities that must take place in order to ensure the continued operations of the base;
- initiate activities aimed at preventing further environmental damage or pollution, wastewater treatment, hazardous waste management, land management for control of erosion and protection of rare and endangered species.

**The Adazi Military Training Base** is situated in Riga District, approximately 15 km to the north-east from Riga City border and about 30 km from Riga Centrum.

Latvian Army has used the Adazi Military Training Area for infantry training and as an area for artillery range in years 1930-1940. During Soviet times there was a training area that was used as training ground (also for shooting) for motorised infantry and tank regiment commanders as well as specialists of tank, artillery and auto units. The Latvian Ministry of Defence took charge of Adazi base from the Russian militaries in 1995, and the Adazi Training Centre was established. There are barracks, driving range, maintenance shop for vehicles and field practice. Currently area of training range is about 4500 hectares. Today the National Armed Forces and BALTBAT use the Adazi Training Centre as training ground for driving, light shooting and co-ordinated practice between different units and countries.

At present moment the Adazi project is in an active investigation stage and main activities are run in three direction investigation of pollution of ground and water media of the Adazi Military Training Base (Latvian consulting company "Geo Consultants");  
evaluation for rare and endangered species (consultants from Latvian Fund for Nature);  
inventory of infrastructure objects in the Adazi Training Base (specialists from Swedish and Latvian MoD).

It is planed to finish the project at the end of 1999. The Environmental Base Management Plan will developed within the scope of work of this project will contain all the basic information about the Adazi Military Training Base and recommendations for organisation activities in environmentally sound way in the Base (including responsibilities of personnel, use and maintenance of infrastructure objects, to take care the territory of Base, environmental training of military staff, etc.).

Presently the investigations already curried out on the site, indicate that there are some harmfully polluted spots left by Russian Army at the territory of the Adazi Base. According to existing legislation the Base Administration (Commander) is responsible for the base management (including remediation of historical pollution).

Goals of the ongoing activities and those already curried out in the area of polluted sites are:

- to create economic and juridical mechanisms for solution of the historical pollution problem;
- to implement the principle "Polluter pays" for current activities;
- to form economic and juridical mechanisms for pollution prevention and pollution control.

The main approaches used in the Republic of Latvia for solution of the problem of contaminated sites are:

- use of co-financing mechanism for funding of necessary investigation and clean-up activities (state, municipal, international donor and private means),
- making assessment of pollution (common and in some cases also very detailed) of former military sites
- organizing of training for Latvian specialists (including military personnel) ,
- use of assistance from international organizations and from bilateral cooperation with main donor countries as much as possible,
- clean-up pilot projects in main harmful sites,
- negotiations with landowners, investors etc. in every specific case about terms of clean-up activities (clean-up standards, budgeting, land tax reductions etc.).

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### **The main functions of the draft Law on Pollution Control concerning the contaminated areas**

- provide inventory and registration of contaminated and potentially contaminated areas in Latvia;
- determine general preconditions for information, investigation and remediation measures in connection with contaminated and potentially contaminated areas;
- determine the financial liability for investigation and remediation measures;
- provide the necessary legal means for State institutions to conduct and administer investigations and remediations.

### **Criteria for investigation of former military sites developed by Latvian and Norwegian specialists**

- I group – it is evident that site is polluted with hazardous substances and poisons which spread into the environment or the site is contaminated with explosives which all together could cause essential threat to human life and to the environment, detailed investigations and clean-up activities are urgent;
- II group – there is only some information about pollution of the site with hazardous substances which could cause threat to human life and to the environment, further site investigations are required;
- III group – pollution of site is insignificant and possibility of migration of hazardous substances also is unessential, site investigations are required only in case of change of land use;
- IV group – no evidence of pollution and hazardous materials, further site investigations are not required.

### **Detailed pollution investigations of former military sites carried out in Latvia**

- the investigations of Lievarde and Rumbula airfields (with assistance of Germany and Denmark),
- the investigation and remediation pilot project of rocket base in Liepaja district (in cooperation with Canada),
- the investigations of fuel base and site of former tank reparation plant in Riga (in cooperation with Norway),
- ongoing activities in Adazi training field (cooperation with USA and Sweden),
- Liepaja Harbour Environmental Study (Phare Programme with participation of Danish specialists),
- the investigation of a part of the former Dobeles tank training range,
- planned activities in a part of former Liepaja Naval Base - Liepaja Karosta district (in cooperation with Canada).

### **The main goals of the Environmental Security Project**

- to strengthen the co-operation and co-ordination between military and civilian organisations;
- to train the military personnel in the environmental management and to prevent further degradation.

### **Goals for ongoing activities and those already carried out in an area of polluted sites**

- creation of economic and juridical mechanisms for solution of the historical pollution problem;
- implementation of the principle "Polluter pays" for current activities;
- formation of economic and juridical mechanisms for pollution prevention and pollution control.



**The main approaches used in the Republic of Latvia  
for solution of the problem of contaminated sites**

- to use co-financing approach for funding necessary investigation and clean-up activities (state, municipal, international donor and private means),
- to make assessment of pollution (common and in some cases also very detailed) of former military sites
- to organize training for Latvian specialists (including military personnel) ,
- to get as much as possible assistance from international organizations and from bilateral cooperation with main donor countries,
- to carry out some clean-up pilot projects in main harmful sites,
- to negotiate with landowners, investors etc. in every concrete case about terms of clean-up activities (clean-up standards, budgeting, land tax reductions etc.).